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Pablo Lavado
Universidad del Pacífico

Santiago Cueto
Group for the Analysis of Development

Gustavo Yamada
Universidad del Pacífico and IZA

Micaela Wensjoe
Group for the Analysis of Development

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

The Effect of Fe y Alegria on School Achievement: Exploiting a School Lottery Selection as a Natural Experiment[1]

Fe y Alegria is an organization working in many developing countries as a public-private partnership. This study estimates the effect of one Fe y Alegria school in Peru on mathematics and reading comprehension among second grade primary pupils, between 2007 and 2012. The identification strategy is based on the fact that for this school Fe y Alegría conducted a lottery to determine which students would be accepted onto first grade. We could prepare our estimates only for one school where records for several years were available. The results show that this Fe y Alegria school generated substantial score gains for lottery winners, equivalent to 0.4 standard deviations. We also found that this effect has been increasing over time. In reading comprehension the effect was 0.17 s.d. in 2007 and 1.02 s.d. in 2012. In math, the effect was 0.29 s.d. in 2007 and 1.2 in 2012. These are promising results in a country where overall student achievement in standardized tests has been low, and where discussions on under what conditions may public partnerships result in better educational outcomes.

JEL Classification: C13, C33, C93, I21, I22

Keywords: education, public-private partnerships, quality education, Fe y Alegría, math performance, private school, reading comprehension performance

Corresponding author:
Gustavo Yamada
Department of Economics
Universidad del Pacífico
Av. Salaverry 2020
Lima 11
Peru

E-mail: yamada_ga@up.edu.pe

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Introduction

Public-private partnerships (PPP) are taking an increasingly key role in improving quality in education. Current debate about the role of public-private partnerships in education and their contribution to children's learning has become intense, even though evidence on its impact is scarce (Patrinos, Barrera-Osorio and Guáqueta, 2009). PPPs are particularly important in developing countries whose government inefficiencies do not allow provide a high quality education to everyone (Angrist, Bettinger, Bloom, King, & Kremer, 2002).

Private-public associations were born from the union between States' and religion organizations, private providers or Non-Governmental Organizations (NGOs). These partnerships can take different forms. Financing is shared between the government and the private organization, where governments finance teacher's salaries, private organization finance infrastructure, management, etc. (Lewis & Patrinos, 2012). This scheme ensures competition in the education sector because of the increase of the teacher's training, better infrastructure and school materials and well-equipped classrooms (LaRocque & Patrinos, 2007). The main characteristic is that school management gains some degree of autonomy, with more flexible rules than in public schools.

Studies show a positive effect of PPPs in learning outcomes: In Chicago, Hoxby and Rockoff (2005) found improvements of 10–11 percentage points in the early grades of charter schools. By contrast, in New York, Hoxby and Murarka (2007) found that the charter school effect was evident for lowest grades in math and reading comprehension (0.09 and 0.04). These effects are maintained in the long run for schools from Arizona, Florida, and Texas in United States (Bookern et al., 2007, Bettinger, 2005, Hanushek et al., 2007). Finally, Barrera-Osorio (2007), based on the program Concession Schools, concluded that, in private schools providing public education in Colombia, there are positive effects in math and reading comprehension (0.19 and 0.27 respectively).

In this context, the main objective of this study is to estimate the impact of a worldwide PPP (Fe y Alegría, FyA) on children's learning. Despite the effort devoted by FyA's to enhance low income children's education, there is no evidence of a rigorous assessment of this experience. It is selected because FyA is a large PPP in education in the world with a strong religious content.

FyA is a large PPP based on an autonomous school administration with public finance. FyA manages schools in Spain, Latin America and Africa. Founded in 1960, and currently operating in 1240 schools serving 1,473,074 children in 20 countries (Fe y Alegría, s.f). Its target population is comprised of low income children. The main characteristic of FyA is that is an independent organization from the Catholic Church, in particular from the Jesuits, thus teaching religion is a strong emphasis on these schools.

The main attribute of FyA is the autonomy that State gives to choose their administrative (including the director) and teaching staff. Teachers and adiministrative's salaries are paid by the state, which also pays for teaching materials and school facilities (Alcázar & Cieza, 2002). FyA partly pays maintenance and other current expenses through a number of activities, initiatives and, mainly, European donations. FyA's freedom to manage its human resources includes freedom to recruit, train and evaluate them, based on their performance and the children's learning. However, this resources have been declining due to European financial crisis.

Another FyA's peculiarity is its close relationship with parents. In particular, parents must attend schools for sessions, academic follow up meetings, classroom committees and school general meetings. Also, they help in fund raising through a number of social events. In addition, three Sundays every year they must help to improve facilities (for instance, fixing classrooms' roofs, painting walls, repairing chairs and tables, etc.) Parents must also make two payments to the school. The first, worth 50 Peruvian soles (approximately 14.64 USD[2]), is their annual contribution to the parent's association, in compliance with norms that regulate these associations' involvement in public educational institutions (Law 28628). The second payment is made by primary students' parents, who must pay 40 soles (11.71 USD) annually, for teaching materials (photocopies) and to finance holiday activities (school sports competitions, mother's day, etc.). Families who cannot afford those payments are exempted, and school pays their contributions. These payments are not required for children's enrollment.

The main identification strategy is a natural experiment based on an admission lottery done in a typical FyA school in Lima (Peru). FyA schools are in high demand because of their good reputation and tuition-free education. Consequently, because of excess of applicants, they follow a sequential

[2] The current exchange rate is 3.42 soles per dollar.

selection. First, potentially interested parents are invited to register. Alumni´s children or students' siblings are admitted directly. The next priority goes to district residents, particularly indigent applicants. Finally, when the number of applicants exceeds available vacancies, students are admitted by lottery. The lottery takes place at the school in an open meeting to all registered parents. The registration application numbers are extracted one by one from a box until completing the number of available openings. Another 10 or 15 additional numbers are also extracted. The students whose registration form numbers are selected in the lottery are offered a place. If parents do not deliver the required documents in time or fail to register for some reason, the place is offered to the first additional number chosen. We used lotteries from 2006 to 2011. These random lotteries allow estimating the impact that FyA has on school performance in math and reading comprehension from a Census evaluation implemented by Ministry of Education and addressing the issue created by selection bias incurred in previous studies (Swope and Latorre (1998), Parra and Wodon (2009)).

The school under study was founded in 1980 in one of Lima's most densely populated and poorest districts. The district has 12% of the capital city's population. The local poverty rate is estimated at 24%, compared to Lima's 5%. All their students live in that district. The facilities of the FyA school under study comprise 24 primary grade classrooms and 25 secondary school classrooms with an average of 35 students per class. The school's management includes a superintendent, a primary deputy superintendent, the secondary school coordinator and the pastoral coordinator, all women. The school operates in two shifts. The morning shift runs from 7:30 to 13:05 and accommodates the high school classes, while the primary school students attend from 13:15 to 18:05. A total of 66 teachers teach at the school: 28 in primary school and 38 in high school. Primary classes are taught by one (male or female) teacher each, charged with teaching all class courses. In high school, although each class has an appointed tutor, classes are taught by several teachers (each teaching a specific subject). The school runs four workshops for high school students: dress making, wood working, office automation and electricity repairs. All students must attend the four workshops in their first two years of high school and then choose the area where they will specialize in their last three high school years.

The main results show that the effect of studying in FyA is 0.39 and 0.41 standard deviations (sd) in math and reading comprehension, respectively. When FyA is compared with public or private

schools, for reading comprehension, it is observed an effect of -0.37 sd in private school and -0.5 sd for public school. While for math, it is observed an effect of -0.36 sd in private school and -0.5 sd for public school.

The remainder of this paper is organized as follows. First, we present the data and empirical strategy and some descriptive results. Then, we show empirical results and the comparison between FyA and public or private schools. Third, it makes reference about main mechanism in FyA school and finally, it is concluded.

Data and empirical strategy

We started by reviewing the list of applicants to the FyA school described above for years 2006, 2007, 2008, 2009 and 2011. There are 543 students registered for those years' lotteries. The list of winning students was sent to the Ministry of Education's Quality Measurement Unit. The Ministry returned an anonymous listing with the results of the math and reading comprehension tests they took while they were in primary and second grade students nationwide (the Students Census Evaluation), classified by gender and school where the student took the test. The Ministry of Education's listing covered 471 students, approximately 87% of all lottery participants. Of 72 for whom no data was found, 37 had won the lottery to study at FyA school and 35 lost the lottery. In other words, those students for whom no information was found seemed to be equally distributed among lottery participants and non-participants. Likewise, the number of lost records by year is balanced between winners and non-winners. However, we also found an increase in the number of lost records, as we move back in time. In 2007 and 2008, 19 records were lost in each year, while for years 2009, 2010 and 2012, 13, 12 and 9 were lost, respectively.

The sample's number of students for whom we have data (462), 328 were admitted at the FyA school under review, 85 were admitted to other public schools, and 49 enrolled in private schools[3]. This is an interesting result because it shows that a number of families who were willing to register their children at Fe y Alegría school, at no cost, decided to pay tuition in a private school rather than send their children to a public school when unable to register at FyA. The number of students who

[3] See Appendix N° 1.

declined to attend FyA school, even though they had won the lottery is 6 students for all years, approximately 2% of lottery winners.

The Fe y Alegría lottery may be regarded as a social controlled experiment. In this scheme and following the evaluation parameters (power of 80%, significance level at 95%, 70% treated and 462 total observations), the minimum detectable effect is set at 0.25 standard deviations. Using the same calculation but only comparing FyA with other public schools, the minimum detectable effect is 0.30. The same comparative calculation between FyA and other private schools shows a minimum detectable effect of 0.37.

Table 1 includes a set of descriptive statistics gathered before the lottery between chosen students and non-chosen students for years 2013, 2014 and 2015. Similar records are not available for other years because either data had not been gathered or records were lost. In turn, census evaluation results are not available for children tallied in the descriptive statistics.

For lottery participants, we would expect the variables before treatment to be balanced. In fact, there are no statistically significant differences for most socio-economic variables. Significant differences are found in the mother's education. However, these factors do not always benefit the set of admitted students.

Table 1: Descriptive statistics

VARIABLES	(1) Admitted	(2) Not admitted	(3) Admitted versus not admitted
Male	0.473	0.484	-0.012
	(0.500)	(0.501)	(0.050)
Father lives at home	0.906	0.852	0.054*
	(0.292)	(0.356)	(0.031)
Mother lives at home	0.978	0.963	0.015
	(0.146)	(0.189)	(0.016)
Single household family	0.426	0.463	-0.037
	(0.495)	(0.500)	(0.049)
Cement and mortar house	0.856	0.833	0.022
	(0.352)	(0.374)	(0.036)
Home owner	0.426	0.432	-0.006
	(0.495)	(0.497)	(0.049)

House with water and sanitation connection	0.931	0.932	-0.001
	(0.253)	(0.252)	(0.025)
House with electricity connection	0.946	0.963	-0.017
	(0.227)	(0.189)	(0.021)
Father with no schooling	0.052	0.029	0.023
	(0.222)	(0.168)	(0.022)
Father with primary schooling	0.231	0.261	-0.030
	(0.422)	(0.441)	(0.045)
Father with secondary schooling	0.538	0.580	-0.042
	(0.500)	(0.495)	(0.053)
Father with higher education	0.179	0.130	0.049
	(0.384)	(0.338)	(0.039)
Immigrant father	0.490	0.478	0.012
	(0.501)	(0.501)	(0.053)
Mother with no schooling	0.059	0.064	-0.005
	(0.236)	(0.246)	(0.024)
Mother with primary schooling	0.232	0.353	-0.120**
	(0.423)	(0.479)	(0.045)
Mother with secondary schooling	0.557	0.519	0.038
	(0.498)	(0.501)	(0.050)
Mother with higher education	0.151	0.064	0.087**
	(0.359)	(0.246)	(0.032)
Immigrant mother	0.458	0.455	0.002
	(0.499)	(0.500)	(0.050)
Number of observations	277	162	439

Note: Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, *p<0.1).
Column (3) shows the regression coefficient for the variable shown in each row over a constant and a dummy variable equal to one if the student won the lottery and zero otherwise.
In addition, we estimated the probability of winning the lottery compared to all other characteristic variable. No significant coefficient was found at 95% confidence, excepting for the presence of the father in the household (a positive correlation with winning the lottery). Pseudo R^2 was 0.042and the likelihood of the Wald F test was 0.12.

Tables 2 and 3 show a set of descriptive statistics on reading comprehension and math performance. It is after the lottery between chosen students and non-chosen students for years 2007, 2008, 2009, 2010 and 2012. The column 3 show the differences between mean of students admitted and not admitted. It shows that admitted students have performance higher than not admitted students, and this difference have been growing through time.

Table 2: Descriptive statistics for reading comprehension performance

Year	Admitted	Not admitted	Admitted versus not admitted
2007	562.31 (75.715) 62	561.83 (99.346) 29	13.06 (21.24)
2008	547.94 (51.703) 62	546.48 (75.618) 35	1.259 (14.66)
2009	562.65 (59.969) 75	542.48 (64.526) 21	16.60 (16.61)
2010	589.1 (67.739) 60	553.11 (65.813) 38	36.26** (14.01)
2012	655.07 (65.437) 69	563.55 (80.841) 20	91.52*** (19.50)

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1).
Note: The order of the statistics are: mean, standard deviation and number of observations. Differences are just for the mean.

Table 3: Descriptive statistics for math performance

Year	Admitted	Not admitted	Admitted versus not admitted
2007	539.58 (80.826) 62	527.46 (89.312) 28	29.83* (16.91)
2008	506.19 (49.548) 62	552.86 (71.350) 35	-47.28*** (13.87)

2009	595.37 (97.421) 75	550.67 (111.736) 21	39.85 (28.65)
2010	581.92 (107.016) 60	518.92 (90.696) 38	63.73*** (20.45)
2012	686.32 (94.475) 69	527.05 (87.582) 20	159.3*** (22.43)

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1).
Note: The order of the statistics are: mean, standard deviation and number of observations. Differences are just for the mean.

Two equations were estimated to determine the impact of attending the Fe y Alegría school on math and reading comprehension performance. The first equation is as follows:

$$y_i = \beta_0 + \rho F_i + \gamma_t + u_i$$

Where y_i is the performance of the individual i, it was standardized subtracting the mean and dividing the standard deviation by year, β_0 is a constant, γ_t is a fixed effect per year, F_i variable records whether the student was elected randomly to study at the FyA school and u_{it} is an error term to capture random fluctuations in performance tests. The (average) causal effect is ρ. The second equation is a follows:

$$y_i = \beta_0 + \rho_{pub} Pub_i + \rho_{pri} Pri_i + \gamma_t + \varepsilon_i$$

Where Pub_i is a dichotomic variable that takes value 1 if individual *i* loses the lottery in year t and attends another public school and zero otherwise, Pri_i is a dichotomic variable that takes value 1 if the individual *i* loses the lottery in year t and attends a private school, and 0 otherwise, and ε_i is an error term to capture random fluctuations in performance tests. Parameters ρ_{pub} and ρ_{pri} measure the effect of not attending a FyA school compared to attending another public school or a private school, respectively.

Results

Tables 4 show lottery winning students reached performance levels of 0.39 and 0.41 standard deviations above those of non-winning students in reading comprehension and math tests respectively. This is a remarkable result because they are both above findings by Angrist et al. (2010) for KIPP schools in Boston and by Abdulkadiroglu et al. (2009) in Boston's schools.

We also compared the results obtained in Fe y Alegría and outcomes in public and private schools. Although it is true that for non-winning lottery participants attending a public or private school would not be a lottery-driven decision, these results are reported here to explain the origin of the main differences between them. In particular lottery winners showed 0.40 and 0.36 standard deviations above non-winning applicants who attended a public school for their reading comprehension and math tests, respectively. Meanwhile, lottery winners performed 0.37 and 0.5 standard deviations above non-winning students who later attended a private school, in their reading comprehension and math tests, respectively. From these results we could say that gather private schools attended by some of non-winning students are worse than the other public schools where the remaining non-winning students enrolled, particularly as in math. This result contradicts the parents' perception that private schools provide better quality education. Since no lottery helps to determine which of the non-winners would attend a public or private school, this estimate includes a selection bias. If we think that those students attending a private school come from families who have marginally higher incomes, we may say that their children are marginally more skilled and therefore, the effect identified would be mitigated by these greater skills. Consequently, the estimate would set a lower bound negative effect of attending a private school but even a larger negative effect would be expected when controlling for skills. A reverse finding would result from a comparison with other public schools: we expect that assuming a lower difference between FyA and other public schools when controlling for skills.

Table 4: Performance estimates

	Reading comprehension		Math	
VARIABLES	(1)	(2)	(1)	(2)
Fe y Alegría school	**0.386*** **		**0.413*** **	
	(0.103)		**(0.0913)**	
Private school		**-0.371** **		**-0.504*** **
		(0.158)		**(0.116)**
Public school		**-0.395*** **		**-0.360** **
		(0.133)		**(0.136)**
Observations	462	462	462	462
R-square	0.191	0.191	0.225	0.227

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1).
Regressions include year fixed effects and the constant.

Estimates were made by quartile to determine whether there exists heterogeneous effects by level of performance, as shown in Tables 5 and 6. Estimates were made for the lowest and highest quartile. It was found that students with lower performance than FyA students showed a significant impact (0.52 and 0.49 for the lowest quartile in reading comprehension and math, respectively, compared to 0.17 and 0.24 for the highest quartile for reading comprehension and math, respectively). This may be due to Fe y Alegría's efforts to level off classes by providing additional support to lagging students.

Results do not change when we compare the types of school attended by non-winners. FyA perform is better than public and private schools for all quartiles. In particular, students in the lowest quartile did much better in Fe y Alegría than those in the highest quartile; students who attended a public schools perform worse than students who attended a private school in reading comprehension for all quartiles.

However, in math, students who attended a public school perform worse than students who attended a private school just for the lowest quartile. We observe the inverse in the highest quartile.

Table 5: Reading comprehension performance (Quantile regression).

VARIABLES	(1) Lowest Quartile	(2) Highest Quartile	(3) Lowest Quartile	(4) Highest Quartile
Fe y Alegria 26 school	**0.520*** **	**0.169*** **		
	(0.151)	**(0.0282)**		
Private school			**-0.416** **	**-0.169** **
			(0.192)	**(0.0543)**
Public school			**-0.663*** **	**-0.182*** **
			(0.160)	**(0.0435)**
Observations	462	462	462	462
Pseudo R-square	0.0772	0.1460	0.0790	0.1460

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1).
Regressions include year fixed effects and the constant.

Table 6: Mathematics performance (Quantile regression).

VARIABLES	(1) Lowest Quartile	(2) Highest Quartile	(3) Lowest Quartile	(4) Highest Quartile
Fe y Alegria 26 school	**0.488*** **	**0.239* **		
	(0.106)	**(0.135)**		
Private school			**-0.478*** **	**-0.373*** **
			(0.165)	**(0.105)**
Public school			**-0.593*** **	**-0.134* **
			(0.136)	**(0.0790)**
Observations	462	462	462	462
Pseudo R-square	0.091	0.1626	0.0913	0.1647

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1).
Regressions include year fixed effects and the constant.

The study estimated the effects by year to determine whether the impact of attending a FyA school changed over time. Our findings (Table 7) show on average for 2007 the FyA school under study has a positive and significant effect both on reading comprehension and math, with total 0.17 and 0.29 standard deviations, respectively. The marginal effects have been positive and increasing through time (excepting for the negative outcome for math in 2008), though not statistically significant. It is noteworthy that in 2012: the total effect reached 1.02 and 1.2 standard deviations for reading comprehension and math. This result may be due to the fact that the census evaluation of second

grade students used in this study was administered for the first time in 2006, but it has become increasingly relevant over the years, as it gained more public attention (especially given the attention given to it by the media). It may be that interest in this Census evaluation started in this school in 2009 and plans were developed with teachers to engage in pedagogical activities aimed at enhancing the student body's performance[4]. These findings are surprising because they would be ten and five times larger than effects identified by Angrist et. al. (2010) for reading comprehension and math, respectively.

Table 7: Estimates for interactions

	Reading comprehension	Math
VARIABLES	(1)	(1)
Fe y Alegría school	**0.170**	**0.285****
	(0.241)	**(0.137)**
FyA*2008	-0.153	**-0.738*****
	(0.265)	**(0.208)**
FyA*2009	0.0461	0.0958
	(0.284)	(0.281)
FyA*2010	0.302	0.324
	(0.290)	(0.200)
FyA*2012	**1.021*****	**1.238*****
	(0.266)	**(0.224)**
Observations	462	462
R-square	0.222	0.305

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1).
Regressions include the fixed effect and the constant.
The year 2011 is not in the regression because that year there was not any test.

There are two main mechanisms through which FyA is obtaining such important effect. The first one is the high ability of directors chosen by FyA, in particular with better pedagogical and management skills. Better managements transpires to better equipment (computer room, library), better infrastructure (students with tables, classrooms without requiring repairs) and public services more (electricity, water and sanitation). The effect of these components can be seen on the table 8. The

[4]We visited the school to check our hypothesis. They started preparing students to the test. At least three times a year since 2010.

second mechanism is an important change in 2010. Based on 2007-2009 tests, FyA change the deputy director and devoted more effort in preparing students for the test. In particular, they started with mock tests at least three times a year before the regular test on November, each year.

Table 8: Descriptive statistics of the variables in the Educational Census

VARIABLE	(1) Admitted	(2) Not admitted	(3) Admitted versus not admitted
Director with pedagogical studies	Yes	0.918	0.0919***
		(0.276)	(0.024)
Computer Room at school	Yes	0.776	0.223***
		(0.418)	(0.036)
School library	Yes	0.649	0.351***
		(0.479)	(0.040)
Students without folder / chair / table at school	No	1.731	-1.803***
		(5.368)	(0.472)
Classrooms requiring repairs	2.076	7.276	-5.429***
children in school	(1.664)	(12.95)	(1.075)
Electricity in school	Yes	0.821	0.176***
		(0.385)	(0.032)
Drinking water at school	Yes	0.813	0.183***
		(0.391)	(0.032)
Sanitation at school	Yes	0.821	0.175***
		(0.385)	(0.031)

Note: Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, *p<0.1).
Column (3) shows the regression coefficient for the variable shown in each row over a constant and a dummy variable equal to one if the student won the lottery and zero otherwise.
In addition, we estimated the probability of winning the lottery compared to all other characteristic variable. No significant coefficient was found at 95% confidence, excepting for the presence of the father in the household (a positive correlation with winning the lottery). Pseudo R^2 was 0.042and the likelihood of the Wald F test was 0.12.

Conclusions

The role of public-private partnerships in education may play in increasing quality and reducing inequality in developing countries is a matter of great policy relevance. In this paper we have estimated the effect of a large worldwide partnership private-public, Fe y Alegría, on the achievement of relatively poor students in second grade. Our estimates suggest that the FyA school under analysis accomplished a significant gain in learning and performance in both math and reading comprehension (0.4 standard deviations). Although it was not possible to determine the exact initial characteristics of lottery winners compared to non-winners, due to insufficient information, the

characteristics of the schools where both groups were enrolled were used as a proxy for this analysis.

The main differences we find between FyA school and others on basically due to the director. This transpire to no significant differences were observed between the FyA school in this study and the schools attended by the non-winning students (except for facilities including libraries and computer rooms). In addition, our analysis by quartiles determined the positive impact of Fe y Alegría schools over learning is higher in the lower performance quartiles (approximately 0.5 standard deviations), with a larger difference in reading comprehension (0.52 standard deviations). Another interesting finding is that the Fe y Alegría school in this study has a larger impact in math when compared to a private school (0.5 standard deviations). Finally the positive effect of Fe y Alegría has increased over time, particularly in 2012. Reading comprehension rose from 0.17 standard deviations in 2007 to 1.02 s.d. in 2012. In math, its impact rose from 0.29 in 2007 to 1.2 s.d. in 2012. Estimating this effect in the FyA school under study is significant because it shows a much larger gain than so far reported in the literature (Angrist et al. 2010). No international experience has been recorded showing such a large effect, as the one estimated in this study.

Our findings point to the need for more research on how classroom management evolved in those years, and for data from lottery outcomes at other Fe y Alegría schools, with a view at identifying more general effects. Consequently, on the basis of the evidence shown in this and other previous studies, we suggest an in-depth examination of the possibility to adapt the pedagogical and administrative management models enforced in Fe y Alegría schools, and adopt their good practices in other public and private schools nationwide, especially those serving relatively poor, urban populations such as those studied here.

The main limitation of this study is that it was focused on just a single Fe y Alegría school which however is an average Fe y Alegría institution: involving teachers and administrative staff in the school's management, as well as parents. Our findings suggest these characteristics could result in significant gains in children's performance. Expanding this research to other FyA schools in Peru and other countries would also seem an important topic for future research.

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APPENDIX

App 1: Distribution of students excluded from our analysis

In 2007, 2008, 2009, 2010 and 2012; we only included 462 students in our analysis out of a total 543 who joined the lottery to gain admittance in Fe y Alegría. Of all winning and non-winning students, there are 72 missing values in the database. Their distribution by year and sex is as follows:

Total students without Student Census Evaluation data

Year	Female		Male		**Total**
	Winner	Non-winner	Winner	Non-winner	
2006	8	3	2	6	**19**
2007	4	4	5	6	**19**
2008	2	5	3	3	**13**
2009	4	5	1	2	**12**
2011	4	1	2	2	**9**
Total	**22**	**18**	**13**	**19**	**72**

Likewise, since 6 out of the total of non-winning students migrated to other schools outside the San Juan de Lurigancho jurisdiction, a decision was made to exclude these observations from our analysis, because those students' characteristics are presumably different from those of the other non-winning students who enrolled at some other school in San Juan de Lurigancho. Likewise, two students in the non-winners group chose to migrate to other Fe y Alegría schools in San Juan de Lurigancho, where they gained admission. To isolate the impact of Fe y Alegría, we chose to remove these observations. Finally, we also removed data for one non-winning student for whom there is no record of grades in mathematics. Our initial database screening yielded a total 462 students, whose data was used for the statistical and econometric analyses.